

Claims

The claims defining this invention are as follows:

1. A method of activating and metallising an aromatic polymer film including
5 the steps of:
 - pre-treating a first surface of the film with a basic solution ;
 - following the pre-treatment step, applying to said first surface of the film an aqueous seeding solution comprising polymer-stabilised catalyst particles; and
 - 10 • then immersing the film in an electroless plating bath comprising ions of a desired metal so as to deposit a layer of said metal onto the first surface of said film.
2. The method of claim 1, wherein the basic solution is a solution of potassium hydroxide.
- 15 3. The method of claim 1 or claim 2, wherein after the basic solution treatment step, an acidic solution is applied to said first surface.
4. The method of claim 3 wherein the acidic solution is a solution of protic acid such as hydrochloric acid (HCl) or acetic acid.
5. The method of any one of claims 1 to 4, wherein the aqueous seeding
20 solution comprises polymer-stabilised palladium particles.
6. The method of any one of claims 1 to 5, wherein the catalyst particles are stabilised by a water-soluble polymer.
7. The method of claim 6, wherein the water-soluble polymer is polyvinyl pyrrolidone (PVP) or polyvinyl alcohol (PVA).
- 25 8. The method of claim 7, wherein the water-soluble polymer is PVP.
9. The method of any one of claims 5 to 8, wherein the palladium particles have diameters of from 1 to 50 nanometers.
10. The method of any one claims 1 to 9, wherein the desired metal is selected from the group consisting of nickel, copper and gold.

11. The method of claim 10, wherein the desired metal is nickel or copper.
12. The method of any one of claims 1 to 11, wherein the basic solution is applied by immersing the film in a bath of the basic solution.
13. The method of any one of claims 1 to 11, wherein the basic solution is applied by spraying a layer of the solution onto the first surface of said film.
14. The method of claim 12 or claim 13, wherein the film is maintained in contact with the basic solution for 1 to 15 minutes after which the basic solution is washed off.
15. The method of any one of claims 1 to 14, wherein the aqueous seeding solution is applied by immersing the film in a bath of the seeding solution.
16. The method of claim 15, wherein said immersion is for a period of from 5 to 60 seconds.
17. The method of any one of claims 1 to 16, wherein, after application of the aqueous seeding solution, the film is washed with de-ionised water to remove excess catalyst particles.
18. The method of any one of claims 1 to 17, wherein after the depositing of the layer of the desired metal, the film is washed with de-ionised water and dried.
19. The method of any one of claims 1 to 18, wherein after the depositing of the layer of the desired metal, the film is heated to improve adhesion between the film and the metal layer.
20. The method of any one of claims 1 to 19, wherein prior to the step of applying the basic solution, vias are formed, either substantially or entirely, through the film.
21. The method of claim 20, wherein the vias are formed using laser drilling techniques.
22. The method of any one of claims 1 to 21, wherein prior to the step of applying the basic solution, photoresist material is applied to the film and

said photoresist material is developed so as to facilitate patterning of desired circuitry onto said film.

23. The method of any one of claims 1 to 22 wherein, prior to the step of applying the basic solution, the film is cleaned and dried.
- 5 24. The method of claim 23, wherein the cleaning is effected by ultrasonication in acetone and de-ionised water.
25. The method of claim 24, wherein further cleaning is effected by ozone treatment at elevated temperature.
- 10 26. The method of claim 25, wherein the ozone treatment is conducted at about 80°C for between 3 and 10 minutes.
27. The method of any one of claims 1 to 26, wherein the aromatic polymer film is formed of polyimide.
28. A method of activating and metallising an aromatic polymer film substantially as hereinbefore described with reference to any one or
15 more of the examples and the drawings.
29. A metal coated aromatic polymer film made according to the method of any one of claims 1 to 28.